

Appl. No. 09/925,740
Amdt. Dated September 2, 2004
Reply to Office Action of June 2, 2004

REMARKS

Claims 5-22 remain in this application. Claims 1-4 and 23-29 have been canceled, without prejudice to the filing of a continuing application directed to the subject matter of these claims. No new matter is added.

Reconsideration of the subject patent application and allowance of all of the claims is respectfully requested in view of the foregoing amendments and the following remarks.

Claim Objections

Claims 5 and 11 are objected to for informalities. Applicants have amended these claims to correct the misspelled words, and respectfully request that the objections be withdrawn.

Rejections Under 35 U.S.C. § 112

Claim 5 stands rejected as indefinite under 35 U.S.C. § 112, second paragraph. The Examiner states that it is unclear what the limitation "not recrystallized" means. Applicants assert that the term "recrystallization" is well known by those skilled in the art to mean the formation of a new set of strain-free grains within a previously cold-worked material. The specification of the present application supports this definition: the second copper foil "inherently has a large number of strains within the foil, generated during rolling process, and tends to recover under heating to be recrystallized very easily." (page 16, lines 22-25). Thus, a person of ordinary skill in the art would clearly understand that "not recrystallized," as applied to the first copper foil of claim 5, means that the first copper foil does not form a new set of strain-free grains during hot pressing. Applicants therefore assert that claim 5 is not indefinite and respectfully request that this rejection be withdrawn.

Rejections Under 35 U.S.C. § 102

Claims 5, 7, 9 and 10 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kashiba et al. (U.S. Patent No. 5,153,077) ("Kashiba"). Regarding claim 5, the Examiner asserts that Kashiba discloses, among other limitations, "wherein the first copper foil is not

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recrystallized during the hot pressing, and wherein the second copper foil is recrystallized during the hot pressing." The Examiner further asserts that "[t]he second foil 2b has the property of being recrystallized under the conditions that exist during a hot pressing step in the manufacturing of the laminate and thus thicker than the first foil."

As an initial matter, Applicants submit that composite substrate of Kashiba is fundamentally different than the presently claimed methods for producing a copper clad laminate. As discussed below, Applicants submit that Kashiba does not disclose the presently claimed recrystallization properties. Furthermore, Applicants submit that Kashiba does not discuss the contraction properties of a first and second copper foil. Specifically, nowhere does Kashiba disclose or suggest that a second copper foil with a thickness greater than that of a first copper foil contracts to a larger extent than the first copper foil during hot pressing. The contraction properties disclosed and claimed in the present application are completely reversed from what would normally be expected. As discussed in the specification on pages 9-10, a thicker copper foil is expected to contract more than a thinner copper foil. This leads to the problem of warping in a copper clad laminate with copper foils of different thicknesses. Kashiba recognizes the problem of warping between copper members (2A, 2B) and a constraining member (3) due to differences in the thermal expansion coefficient of the copper members and the constraining member (col. 10, lines 47-53), but does not suggest the problem of warping due to copper foils of different thicknesses. Furthermore, the present invention remedies the problem of warping by lowering the Young's modulus of the thicker copper foil to minimize its contraction in relation to the thinner copper foil (specification, pages 9-10). Kashiba attempts to minimize warping by integrally bonding the constituent members (col. 11, lines 7-9). Thus, it is evident that the warping recognized by Kashiba and the present application are due to completely different factors, and Kashiba's remedy and the remedy of the present invention are also completely different.

Accordingly, Applicants disagree with the Examiner's characterization of Kashiba and assert that Kashiba does not anticipate claims 5, 7, 9 and 10 of the present application. Applicants assert that the Office Action does not demonstrate a prima facie case of anticipation

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of these claims by Kashiba. Contrary to the Examiner's assertion, Kashiba does not disclose or suggest the limitation of claim 5 that "wherein the first copper foil is not recrystallized during the hot pressing, and wherein the second copper foil is recrystallized during the hot pressing."

Although Kashiba discloses that a pressing force is applied to a ceramic-metal composite substrate in order to achieve "integral bonding" of a ceramic base material with copper/copper alloy metal members (col. 3, lines 28-47), nowhere does Kashiba disclose or suggest that the copper/copper alloy metal members are either recrystallized or not recrystallized during hot pressing. Accordingly, Applicants submit that Kashiba does not disclose or suggest all elements of claim 5. Applicants therefore assert that claim 5 is in a condition for allowance, and request that the rejection of claim 5 be withdrawn.

Regarding claim 7, the Examiner asserts that Kashiba discloses the limitation that "wherein the insulation layer constituent material is a resin." Applicants disagree that Kashiba discloses this limitation. Nowhere does Kashiba disclose or suggest the use of a resin insulation layer constituent material. Kashiba teaches a ceramic-metal composite substrate having a ceramic base member that the Examiner asserts to be the presently claimed insulation layer. However, Kashiba teaches that this ceramic base member is formed of either alumina, aluminum nitride, or silicon carbide (claim 5). These substances are not resins¹, and Applicants assert that a fair reading cannot possibly result in a conclusion that Kashiba discloses or suggests this limitation of claim 7. Furthermore, claim 7 is dependent on claim 5 and incorporates its limitations. As Applicants assert that claim 5 is in a condition for allowance, Applicants request that the rejection of claim 7 be withdrawn.

Regarding claim 9, the Examiner asserts that Kashiba discloses the limitation that "wherein the second copper foil is a S-THE foil." Applicants disagree that Kashiba discloses this limitation. Initially, Applicants point out that claims 9, 15 and 21 have been amended to correct a spelling error; these claims now recite that "the second copper foil is a S-HTE foil." Applicants assert that nowhere does Kashiba disclose or suggest the use of a S-HTE foil (or a S-

¹"Resin: . . . any of a large class of synthetic products that have some of the physical properties of natural resins but are different chemically and are used chiefly in plastics[:] any various products made from a natural resin or a natural polymer." (Merriam-Webster Online; www.webster.com)

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THE foil, for that matter). Neither the section of Kashiba cited by the Examiner, nor any other portion of Kashiba, recites this limitation. The present application refers to a S-HTE foil as a "copper foil easily recrystallized by heat for hot pressing for production of copper clad laminates, even they are electrolyzed" (page 15, lines 19-22). As discussed above, Applicants assert that Kashiba does not disclose or suggest a recrystallized copper foil. Accordingly, Applicants submit that Kashiba does not disclose or suggest this limitation of claim 9. Furthermore, claim 9 is dependent on claim 5 and incorporates its limitations. As Applicants assert that claim 5 is in a condition for allowance, Applicants request that the rejection of claim 9 be withdrawn.

Regarding claim 10, the Examiner asserts that Kashiba discloses the limitation that "wherein, after hot pressing the Young's modulus of the first copper foil is 1.1 times more than the Young's modulus of the second copper foil." Applicants disagree that Kashiba discloses this limitation. Applicants assert that nowhere does Kashiba disclose or suggest the Young's modulus of the copper members of the ceramic-metal composite substrate, and Kashiba certainly does not disclose the comparative relationship between the Young's modulus of its copper members. Accordingly, Applicants submit that Kashiba does not disclose or suggest this limitation of claim 10. Furthermore, claim 10 is dependent on claim 5 and incorporates its limitations. As Applicants assert that claim 5 is in a condition for allowance, Applicants request that the rejection of claim 10 be withdrawn.

Claims 11, 13, 15 and 16 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kashiba. Regarding claim 11, the Examiner asserts that Kashiba discloses, among other limitations, "wherein the first and second copper foils are recrystallized during hot pressing, wherein the second copper foil is more recrystallized than the first copper foil." The Examiner further asserts that "[t]he second foil 2b has the property of being recrystallized under the conditions that exist during a hot pressing step in the manufacturing of the laminate and thus thicker than the first foil."

Applicants disagree with the Examiner's characterization of Kashiba and assert that Kashiba does not anticipate claims 11, 13, 15 and 16 of the present application. Applicants

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assert that the Office Action does not demonstrate a prima facie case of anticipation of these claims by Kashiba. Contrary to the Examiner's assertion, Kashiba does not disclose or suggest the limitation of claim 11 that "wherein the first and second copper foils are recrystallized during said hot pressing, wherein said second copper foil is more recrystallized than said first copper foil." As discussed above, nowhere does Kashiba disclose or suggest that the copper/copper alloy metal members are either recrystallized or not recrystallized during hot pressing. Thus, Kashiba clearly cannot disclose or suggest the relative amount of recrystallization between first and second copper foils. Accordingly, Applicants submit that Kashiba does not disclose or suggest all elements of claim 5. Applicants therefore assert that claim 5 is in a condition for allowance, and request that the rejection of claim 5 be withdrawn.

Claims 13, 15 and 16 have similar limitations as claims 7, 9 and 10, respectively. For the same reasons discussed above for claims 7, 9 and 10, Applicants assert that the Examiner has not demonstrated a prima facie case of anticipation of claims 13, 15 and 16. Furthermore, claims 13, 15 and 16 are dependent on claim 11 and incorporate its limitations. As Applicants assert that claim 11 is in a condition for allowance, Applicants request that the rejection of claims 13, 15 and 16 be withdrawn.

Claims 17, 19, 21 and 22 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kashiba. Regarding claim 17, the Examiner asserts that Kashiba discloses, among other limitations, "wherein the first and second copper foils contract during hot pressing, wherein the second copper foil contracts to a larger extent than the first copper foil during hot pressing." The Examiner further asserts that "[t]he second foil 2b has the property of being recrystallized under the conditions that exist during a hot pressing step in the manufacturing of the laminate and thus thicker than the first foil."

Applicants disagree with the Examiner's characterization of Kashiba and assert that Kashiba does not anticipate claims 17, 19, 21 and 22 of the present application. Applicants assert that the Office Action does not demonstrate a prima facie case of anticipation of these claims by Kashiba. Contrary to the Examiner's assertion, Kashiba does not disclose or suggest

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the limitation of claim 17 that "wherein said first and second copper foil contract during said hot pressing, wherein said second copper foil contracts to a larger extent than said first copper foil during said hot pressing." As discussed above in the initial discussion of Kashiba (where the rejections of claims 5, 7, 9 and 10 have been discussed), nowhere does Kashiba discuss the contraction properties of a first and second copper foil, and it certainly does not disclose or suggest that a second copper foil with a thickness greater than that of a first copper foil contracts to a larger extent than the first copper foil during hot pressing. Accordingly, for the reasons discussed above, Applicants submit that Kashiba does not disclose or suggest all elements of claim 17. Applicants therefore assert that claim 17 is in a condition for allowance, and request that the rejection of claim 17 be withdrawn.

Claims 19, 21 and 22 have similar limitations as claims 7, 9 and 10, respectively. For the same reasons discussed above for claims 7, 9 and 10, Applicants assert that the Examiner has not demonstrated a prima facie case of anticipation of claims 19, 21 and 22. Furthermore, claims 19, 21 and 22 are dependent on claim 17 and incorporate its limitations. As Applicants assert that claim 17 is in a condition for allowance, Applicants request that the rejection of claims 19, 21 and 22 be withdrawn.

Rejections Under 35 U.S.C. § 103

Claims 6, 8, 12, 14, 18 and 20 stand rejected under 35 U.S.C. § 103(a) as obvious over Kashiba. These claims are dependent on claims 5, 11 and 17 and incorporate all of their limitations. As Applicants assert that claims 5, 11 and 17 are in a condition for allowance, Applicants submit that claims 6, 8, 12, 14, 18 and 20 are also patentable and request that their rejections be withdrawn.

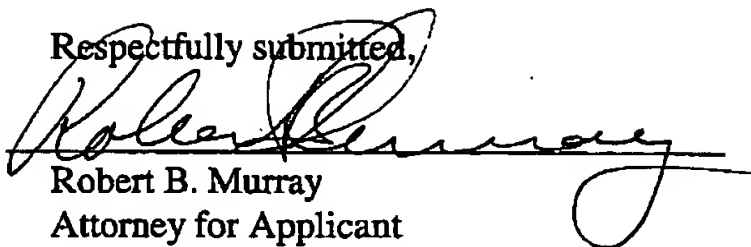
Accordingly, Applicants request that a timely Notice of Allowance be issued in this case.

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